INV14.

Advanced colorimetric sensors based on dye-functionalized nanofibers

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The development of smart colorimetric materials that sense the concentration of a specific analyte by a change in absorbance is particularly interesting, since a color change directly visible for the naked eye is obtained [1]. Color changing textiles play a prominent role among these colorimetric sensors due to their high flexibility, reusability, mechanical stability and breathability. Halochromic, i.e. pH-sensitive, textiles may be highly valuable for various applications in the biomedical field, agriculture, safety and technical textiles. Electrospun sensor materials show a great potential due to their unique properties, resulting in improved sensor sensitivity and response time.

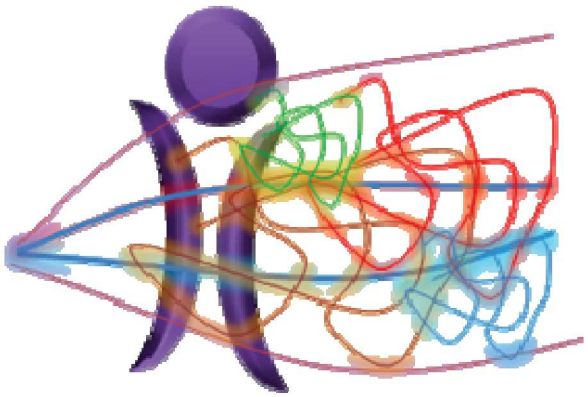
Functionalization of these polymer nanofibres can be done by doping the electrospinning solution prior to fibre formation with pH-sensitive dyes. This technique results in easy-to-produce halochromic nanofibres. Dye leaching, however, is a major problem. An alternative approach to reduce dye leaching is a covalent linkage of the dye to the polymer prior to electrospinning resulting in the most efficient immobilization method. Incorporation of the dye-containing polymer into a nanofibrous membrane can subsequently be achieved by blend electrospinning. Using this method robust halochromic nanofibers can be produced without the dye leaching drawbacks. [2, 3]

References

[1] P.T Mather, “Responsive materials: Soft answers for hard problems”, Nature Materials, 6 (2007), 93-94

[2] E. Schoolaert, I. Steyaert, G. Vancoillie, J. Geltmeyer, K. Lava, R. Hoogenboom, K. De Clerck, “Blend electrospinning of dye-functionalized chitosan and polycaprolactone: towards biocompatible pH-sensors”, Journal of Materials Chemistry B, 2016, 4, 4507-4516.

[3] J. Geltmeyer, G. Vancoillie, I. Steyaert, B. Breyne, G. Cousins, K. Lava, R. Hoogenboom, K. De Buysser, K. De Clerck, “Dye Modification of Nanofibrous Silicon Oxide Membranes for Colorimetric HCl and NH_3 Sensing”, Advanced Functional Materials, accepted.



Book of Abstracts

ElectrospinCY_2017

19th – 21st April 2017 | University of Cyprus, Nicosia, CYPRUS

Conference Programme

Conference/MP1206 final MC meeting Venue: University of Cyprus, New University Campus, (1 Panepistimiou Avenue 2109 Aglantzia, Nicosia. P.O. Box 20537, 1678 Nicosia, Cyprus)

Wednesday 19th April				
08.00-	Registration			
Session A (Building: ΧΩΔ02, Room B205) Chair: T. Krasia-Chistoforou				
9.00-9.10	Welcome and Opening Remarks			
9.10-9.50	**PLENARY**	**G. L. Bowlin** Electrospun Templates: Designing Tools for Directing Endogenous Tissue Regeneration		
9.50-10.30	**PLENARY**	**E. Zussman** Mechanical Stress Induced Drug Delivery from Nanofibers		
10.30-11.00	**Coffee Break**			
Session B1 Energy, sensors and actuators (ΧΩΔ02, B205) Chair: S. Cavaliere			**Session C1 Biomedical applications (ΧΩΔ02, B204) Chair: E. Kijeńska**	
11.00-11.25	**INV1**	**Y. Truong** Electrospun nanofibre membranes for energy and biomaterial applications	**INV7**	**A.Jedlovszky-Hajdú** Creating silver loaded artificial matrix for biomedical applications
11.25-11.50	**INV2**	**A. Macagnano** CdSe/ZnS-TiO_2 nanofibers: A suitable combination for a low cost and effective sensor device	**INV8**	**B. Mijovic** Electrospun composite scaffolds for occular tissue regeneration
11.50-12.15	**INV3**	**D. Pisignano** Enhanced photon couplingand transport properties in electrospun nanowires	**INV9**	**A. Odysseos** Tissue-Engineered Biomimetic Platforms for Signaling Analysis in the Tumor Microenvironment
12.15-12.40	**INV4**	**A. Camposeo** Controlling energy migration and emission properties in semiconducting electrospun polymer fibers	**INV10**	**M. Järvekülg** 3D scaffolds from electrospun gelatin
12.40-12.55	**O1**	**L. Lozzi** Near-field electrospinning: an easy method to grow nano-structured systems	**O5**	**A. Rinaldi** Statistical methods for the design of scaffolds for tissue engineering and cell culturing
13:00-14:30	**Lunch**			
Session B2 Energy, sensors and actuators (ΧΩΔ02, B205) Chair: D. Pisignano			**Session C2 Biomedical applications (ΧΩΔ02, B204) Chair: A.Jedlovszky-Hajdú**	
14.30-14.55	**INV5**	**S. Cavaliere** Nanocomposite membranes based on electrospun nanofibers	**INV11**	**R.Machado** Electrospun silk-elastin fibres functionalized with silver nanoparticles as antibacterial wound dressings

14.55-15.20	**INV6**	**L. Persano** Piezoelectricity in electrospun polymer nanofibers: Fundamental phenomena and applications	**INV12**	**E. Kijeńska** NGF loaded bio-composite scaffolds for peripheral nerve tissue regeneration
15.20-15.35	**O2**	**K. Polak-Krasna** Electrospinning of polymer of intrinsic microporosity for hydrogen storage applications	**O6**	**A. Da Costa** Antibacterial protein-based fibres: combining recombinant DNA technology with electrospinning
15.35-15.50	**O3**	**T.Tätte** Self-formed metal oxide ceramic microtubes and their applications	**O7**	**C. Voniatis** Prospects of poly(vinyl)alcohol scaffolds in abdominal hernia treatment. A study of bio-adaptability in small animals
15. 50-16.05	**O4**	**W. Woon-Fong Leung** Light harvesting in dye sensitized solar cell based on co-sensitizer in core-shell nanofiber configuration reducing charge recombination	**O8**	**M. Kruse** Electro-spun sPEEK Membranes for Oxygenation Applications
16.05-16.20			**O9**	**P. Sajkiewicz** The effect of a solvent on structure, biodegradability and cellular response of electrospun PCL/gelatin and PCL/collagen nanofibers
16.20-16.35			**O10**	**I. Wimpenny** Co-electrospun biomimetic grafts for regeneration of axons in CNS
16.35-16.50			**O11**	**L. Zajíćková** Electrospun PCL/PEG nanofibers with varied biodegradability coated by bioactive amine plasma polymers
17:00-20:00	**Poster and photo competition sessions/cocktail buffet** **Social Activities Building, Room 010**			

Thursday 20th April / MP1206 COST Session				
Session D (Building: XΩΔ02, Room B205) Chair: T. Krasia-Chistoforou				
9.00-9.40	**PLENARY**		**W. Sigmund** Functional Nanomaterials via Electrospinning	
9.40-10.05	**INV13**		**S. Agarwal** Fibers with special morphologies by electrospinning	
10.05-10.30	**Coffee Break**			
Session E1 Processing, morphology control and applications (XΩΔ02, B205) Chair: A. Macagnano			**Session E2 Processing, morphology control and applications (XΩΔ02, B204) Chair: S. Agarwal**	
10.30-10.55	**INV14**	**K. De Clerck** Advanced colorimetric sensors based on dye-functionalized nanofibers	**INV18**	**J.M. Lagaron** Development and characterization of novel electrospun biopolyester coatings for barrier paper applications
10.55-11.20	**INV15**	**C. Adlhart** Amphiphilic ultralight 3D aerogels from electrospun nanofibers	**INV19**	**B. Pilić** Nanofiber based intelligent packaging
11.20-11.45	**INV16**	**P.D. Topham** Block copolymer self-assembly: Rinse-resistant superhydrophobic fabrics made using a combination of electrospinning and electrospraying	**INV20**	**T. Uyar** Decoration of metal nanoparticles (Pt-NP and Pd-NP) on electrospun nanofibers *via* atomic layer deposition for catalytic applications
11.45-12.10	**INV17**	**M.L.Focarete** Atmospheric pressure non-equilibrium plasma applied to electrospinning processes and products	**INV21**	**K. Pielichowski** Surface modification of polylactide by electrospinning of chitosan/nanosilica outer layers to improve flame retardant properties
12.10-12.25	**O12**	**I. Savva** Magnetoactive Electrospun fibers: Fabrication, characterization and applications	**O14**	**L. Daelemans** Nano-engineering highly toughened fibre reinforced polymer composites by interleaving electrospun nanofibres for advanced applications
12.25-12.40	**O13**	**N. Radacsi** Temperature effects on the fiber diameter during the fabrication of PVP and PVA nanofibers by needleless electrospinning	**O15**	**P.Heikkilä** Electrospun sheet materials from CA, PES and PLLA as supports for ALD coating
13:00-14:30	**Lunch**			

Session F1 Environmental and agricultural applications (ΧΩΔ02, B205) Chair: N. Radacsi			Session C3 Biomedical applications (ΧΩΔ02, B204) Chair: J.M. Lagaron	
14.30-14.55	**INV22**	**H.E. Hummel** Electrospun mesofibers in precision viticulture: A new alternative for dispensing sex pheromones in mating disruption schemes for IPM	**INV26**	**A. Greiner** Release of artemisone from electrospun nonwovens for the treatment of malaria
14.55-15.20	**INV23**	**F. De Cesare** Development of smart nanofibrous plant growth promoting rhizobacteria (PGPR) biofilms for agricultural applications	**INV27**	**S.K. Bhullar** Deformation mechanism of smart nanofibrous stents and drug delivery systems
15.20-15.45	**INV24**	**Y. Truong** Large scale preparation and characterization of electrospun carbon particle-nanofibre composites for ammonia adsorption	**INV28**	**U. Stachewicz** 3D analysis of cell responses to electrospun polymer nanofibers scaffolds
15.45-16.10	**INV25**	**M. Roso** Different strategies for enhancing the performance of TiO_2 based nanostructured membranes for VOCs abatement	**INV29**	**E. Kijeńska** PLLA and PCL-based electrospun scaffolds for tissue engineering applications: fabrication and biological characterization
16.10-16.25	**O16**	**Y. Truong** Preparation and characterisation of electrospun gelatin-saponin composite nanofibers	**O22**	**Ž. Rukuižienė** Electrospun web with baltic amber particles
16.25-16.40	**O17**	**M. Maryšková** Enzyme-loaded nanofibrous mats by electrospinning for biomedical and environmental applications	**O23**	**A.S. Sarac** Conductive polyanthranilic acid nanofibers
16.40-17.00	**Coffee Break**			
Session F2 **Environmental and agricultural applications (ΧΩΔ02, B205)** **Chair: K. De Clerck**			**Session C4** **Biomedical applications** **(ΧΩΔ02, B204)** **Chair: A. Greiner**	
17.00-17.15	**O18**	**P. Papaphilippou** Electrospun polymer-based fibrous membranes as adsorbents for bacteria and organic compounds removal from water contaminated media	**O24**	**S. Metwally** Production of charge induced nanofibres scaffolds
17.15-17.30	**O19**	**D.G. Ruzgar** Electrospinning of wool keratin/poly(ethylene	**O25**	**P. Mikes** Complete analysis and comparison of poly(lactic acid-co-

		oxide) blend nanofibers for air filtration application		caprolactone) nanofibers for tissue engineering applications
17.30-17.45	**O20**	**G. Schlatter** Hierachical metal@carbon composite hairy nanofibers for catalytic applications	**O26**	**K. Molnár** Poly(amino acid) based nano gel fibers for tissue engineering
17.45-18.00	**O21**	**W. Woon-Fong Leung** Loading and Cleaning of Nanofiber Air Filter After Long-Term Use		
18.30: **19.30 -:**	**Transportation to the conference dinner venue** **Conference dinner**			

Friday 21st April / MP1206 COST Session (ΧΩΔ02, B205)		
9.30-11.30	**COST MP1206 Management Committee Meeting**	
Session C5 Biomedical applications Chair: T. Krasia-Christoforou		
11.30-11.45	**O27**	**J. E. ten Elshof** Sol-gel derived ceramic nanofibers and their applications in biomedical engineering and electronics
11.45-12.00	**O28**	**L. Liverani** Multilayered scaffolds and graded mineralization for osteochondral tissue engineering applications
12.00-12.15	**O29**	**M. Omastová** Conducting polycaprolactone/polypyrrole nanofiber mats prepared by electrospinning
12.15-12.30	**O30**	**I. Safarik** Magnetically-modified electrospun chitosan-based fibers: Fabrication, characterization and bioapplications
12.30-12.45	**O31**	**Š. Zupančič** Antimicrobial nanofibers for treatment of local infections
12.45-13.00	**Closing remarks**	
13.00-15.00	**Lunch**	

Saturday 22nd April
Post-Conference Social Programme: Post-conference Guided Tour Mountain villages on Troodos Mountains: Kakopetria, Troodos, Omodos (Optional)

POSTER SESSION

Wednesday 19th April 2017, 17:00
Social Activities Building, Room 010

POSTER NUMBER	PRESENTER'S NAME	POSTER TITLE
PO.1	E. Schoolaert	Waterborne electrospinning of poly(N-Isopropyl Acrylamide) towards stable nanofibers
PO.2	J. Dusza	Development of Al_2O_3 electrospun fibers
PO.3	T. Meireman	Interlaminar toughening of resin transfer moulded laminates by electrospun polycaprolactone: Effect of interleave morphology
PO.4	S. Yildirim	Electrospun nanofibers as food contact layer for palladium based oxygen scavenging films
PO.5	M. Mader	Ultralight, biodegradable and highly porous soft polymer sponges based on electrospun fibers
PO.6	A. Portone	Nanocomposite electrospun fibers embedding 2D-Materials
PO.7	N. Radacsi	3D-electrospinning: A novel method to control the structure of nanofibers and its application for nanostructured fuel cells
PO.8	S. Reich	Highly conductive and flexible nonwovens for application as electrodes
PO.9	V. Vassiljeva	Electrospinning of SAN conductive reinforced membranes
PO.10	K. Castkova	Ceramic fibres for energy applications
PO.11	V. Tsigkis	Naturally-derived electrospun fibers with potential applications in batteries
PO.12	W. Gieparda	Flammability and structure of PLA/PHB nanofibers modified with different types of carbon nanotubes.
PO.13	I. Ristić	Elecrospun conductive nano-fibres based on poly(lactide)
PO.14	C. Sofroniou	NSAD drug release from electrospun polymer nanofibers
PO.15	C. Voniatis	Prospects of poly(vinyl)alcohol scaffolds In abdominal hernia treatment. A study of mechanical properties.
PO.16	M. Kokonou	Electrospun PEO/PLLA Fibrous Membranes for Sustained Tyrosine Kinase Inhibitors Delivery in Situ
PO.17	K. Christodoulou	Anthracene-containing electrospun fibers for ammonia gas sensing

PO.18	G. Papaparaskeva	Synthetic strategies towards the combination of hydrogels with electrospun fibers
PO.19	A. Christofi, C. Christou	Lime-based composites reinforced with electrospun fibers
PO.20	M. Nikolaou	Effect of UV irradiation and sonication on the morphology of electrospun polymer-based nanocomposite fibers
PO.21	A. Rinaldi	Cross-cutting opportunities in Europe for technologies foe extreme applications and low or null critical raw material content
PO.22	I. Savva	Chitosan-based electrospun nanocomposite fibrous mats and their bioapplications

Short Biographies of Plenary Speakers

Professor Gary L. Bowlin

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Dr. Bowlin is a Professor and Herbert Herff Chair of Excellence at The University of Memphis in the Department of Biomedical Engineering. Dr. Bowlin's collaborative research has and continues to focus on the application of electrospun templates for tissue engineering and tissue regenerative applications as well as developing hemostatic products, all in the pursuit of saving lives and improving the quality of life. Dr. Bowlin's laboratory has published extensively in these areas with over 125 peer-reviewed manuscripts. Google Scholar data shows his group's published works have been cited over 12,000 times, resulting in an H-index of 48. To date, Dr. Bowlin has been granted 11 U.S. Patents and 32 foreign patents. These patents have helped to start five different companies and several commercially available and regulatory agency cleared products. One of the most recent technologies being developed by St. Teresa Medical, Inc. has completed clinical trials for CE Marking. The latest company, Sweetbio, Inc., is Memphis based and developing novel guided tissue regeneration membranes for dental reconstruction procedures. As a result of this inventiveness and impact, he was recently inducted as a Fellow into the National Academy of Inventors. He is also the Inaugural and current President of the International Society for Biomedical Polymers and Polymeric Biomaterials. Dr. Bowlin received his Ph.D. from the University of Akron in Biomedical Engineering and subsequently completed an American Heart Association sponsored post-doctoral fellowship in the Department of Surgery at Akron City Hospital. In 1997, Dr. Bowlin started his first faculty appointment at Virginia Commonwealth University and rose to the rank of Professor and held the Louis and Ruth Harris Exceptional Scholar Professorship. In August 2013, he relocated to The University of Memphis to continue his research and entrepreneurial endeavors and continued training of the next generation of Biomedical Engineers.

Professor Eyal Zussman

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Dr. Eyal Zussman is the Winograd Professor in the Department of Mechanical Engineering at the Technion – Israel institute of Technology. He holds a DSc degree from the Technion in mechanical engineering. He held postdoctoral appointment at Technical University in Berlin, Germany. Since joining the faculty at the Technion, he has served as Director of the NanoEngineering Group. His group research is in the area of molecular engineering of soft matter, in particular the development of process-structure-property relationships, through the use of simulations and experiments, and the development of functional electrospun fibers. He was Visiting Professor at the Northwestern University (2003), and at the National University of Singapore (2010-2015). He has published over 130 peer-reviewed journal articles.